

## Highlights

- ◆ **In National Science Foundation (NSF) surveys conducted since 1979, about 90 percent of U.S. adults report being very or moderately interested in new scientific discoveries and the use of new inventions and technologies.** Those with more years of formal education and those who have taken more courses in science and mathematics are more likely than others to express a high level of interest in science and technology (S&T).
- ◆ **News about S&T, however, does not attract much public interest.** According to Pew Research Center surveys, only about 2 percent of the most closely followed news stories of the past 15 years were about scientific breakthroughs, research, and exploration. The leading science-related news event of 2000 was the announcement that scientists had completed mapping the human genome. However, only 16 percent of the public claimed to be following that story very closely. Twenty-eight percent said they were closely following news about the Microsoft antitrust court case, an event that may more of a business than a technology story, although the outcome could have a major impact on innovation in the software industry.
- ◆ **The number of people who feel either well informed or moderately well informed about S&T is relatively low.** In 2001, less than 15 percent of NSF survey respondents described themselves as well informed about new scientific discoveries and the use of new inventions and technologies; a substantial minority, approximately 30 to 35 percent, thought that they were poorly informed. People are feeling less informed than they used to. A recent downward trend is particularly noticeable for the five S&T-related issues included in the NSF survey.
- ◆ **Most Americans do not know a lot about S&T.** The general public's ability to answer basic questions about science has hardly changed. For instance, in 2001, only about 50 percent of NSF survey respondents knew that the earliest humans did not live at the same time as dinosaurs, that it takes Earth one year to go around the Sun, that electrons are smaller than atoms, and that antibiotics do not kill viruses. However, the number answering the last item correctly rose from 40 percent in 1995 to 51 percent in 2001, an increase that may be attributable to widespread media coverage of an important public health issue, antibiotic-resistant bacteria.
- ◆ **For the first time, a majority (53 percent) of NSF survey respondents answered "true" to the statement "human beings, as we know them today, developed from earlier species of animals," bringing the United States more in line with other industrialized countries in response to this question.** Although a majority (60 percent) of people surveyed in a Gallup poll were opposed to the Kansas State Board of Education's decision to delete evolution from the state's science standards (a decision that was later reversed), more than two-thirds favored teaching both evolution and creationism in U.S. public school classrooms.
- ◆ **A majority of Americans (about 70 percent) lack a clear understanding of the scientific process.** Although more than 50 percent of NSF survey respondents in 2001 had some understanding of probability, and more than 40 percent were familiar with how an experiment is conducted, only one-third could adequately explain what it means to study something scientifically. Understanding how ideas are investigated and analyzed is a sure sign of scientific literacy. Such critical thinking skills can also prove advantageous in making well-informed choices at the ballot box and in other daily living activities.
- ◆ **All indicators point to widespread support for government funding of basic research.** In 2001, 81 percent of NSF survey respondents agreed with the statement: "Even if it brings no immediate benefits, scientific research that advances the frontiers of knowledge is necessary and should be supported by the Federal Government."
- ◆ **Data from the NSF survey show a gradual decline in public support for genetic engineering over the past 15 years.** The shift can be seen most clearly among the college educated and those classified as attentive to S&T. In no year has a majority of Americans agreed that the benefits of genetic engineering outweighed the harmful results. In 2001, 40 percent of those surveyed thought that the benefits outweighed the harmful results, down from 49 percent in 1985. However, the number of people who think the harms outweigh the benefits has also declined in most years, from 39 percent in 1985 to 33 percent in 2001. Concurrently, the percentage saying that the benefits are equal to the harms increased from 12 percent in 1985 to 28 percent in 2001.
- ◆ **In the 2001 NSF survey, 61 percent of respondents reported that they supported genetically modified food production;** 36 percent said that they were opposed. In addition, 89 percent said that they supported genetic testing to detect inherited diseases (9 percent were opposed), and 47 percent said that they supported cloning animals, about the same as the percentage opposing the technology.
- ◆ **Anti-biotechnology sentiments are much more common in Europe than in the United States.** In addition, the number of people harboring negative perceptions of biotechnology has increased in both Europe and Canada during the past few years, especially when compared with attitudes in the United States. These latest findings are from an international study conducted in late 1999 and early 2000 in the United States, Europe, and Canada.

- ♦ **On a 10-question “pop quiz” on biotechnology, most Americans, Europeans, and Canadians gave the incorrect answer (true) to the statement “ordinary tomatoes do not contain genes, while genetically modified tomatoes do,” and fewer than half the respondents in each region knew that animal genes can be transferred into plants.** On the same quiz, Americans and Canadians seemed to know more than Europeans about the science of biotechnology; they averaged 6.2 and 6.1 correctly answered questions, respectively, compared with Europeans, who averaged 5.4 correctly answered questions. In responding to another question in this quiz, about half of Americans, Europeans, and Canadians knew that more than half of human genetic makeup is identical to that of chimpanzees.
- ♦ **In response to surveys conducted in late 1999 and early 2000, about half of the Americans thought that genetic engineering would “improve our way of life in the next 20 years.”** The corresponding statistics for Europe and Canada were 38 and 50 percent, respectively. However, a sizable minority of Americans (29 percent) said the opposite, that genetic engineering “will make things worse” during the next 20 years, compared with 31 percent of Europeans and 40 percent of Canadians. In all three surveys, biotechnology ranked sixth among the seven technologies that respondents were asked about (only nuclear energy ranked lower). In contrast, more than 80 percent of Americans and Canadians said that solar energy, computers, and telecommunications would improve our way of life in the next 20 years. The corresponding European percentages were somewhat lower but still greater than 70 percent. In addition, approximately 70 percent of Americans, Canadians, and Europeans each thought that the Internet would improve their lives during the next 20 years.
- ♦ **Data from the 2001 NSF survey show that Americans have been listening to what scientists and others have been saying about global climate change.** Nearly 80 percent believe in the existence of global warming, and 53 percent of those surveyed said that the possibility of global warming should be treated as a very serious problem.
- ♦ **Most adults learn about the latest developments in S&T primarily from watching television.** Although the Internet is affecting what Americans know about these subjects, only 9 percent identified it as their main source of information about S&T, compared with those who identified television (44 percent) or newspapers and magazines (16 percent). However, according to a 2000 Pew Research Center survey, the Internet is displacing network news shows in certain types of households. Also, according to the 2001 NSF survey, the Internet is the preferred resource when seeking information about specific scientific issues, indicating that encyclopedias—and every other information resource—have lost a substantial number of customers to the Internet.
- ♦ **Access to the Internet at home is an indicator of both attitudes toward and knowledge of S&T.** Those who have home computers hooked up to the World Wide Web seem to harbor fewer reservations about S&T and have more knowledge of science and the scientific process than their non-access counterparts.
- ♦ **Few characters on prime time entertainment shows are scientists.** According to a recent study, the percentage of prime time television characters who are scientists was less than 2 percent in each year during the mid-1990s. Even though scientists seldom show up on the small screen, the appearance of women and minorities as scientists is even more rare. The reverse was true for foreign nationals, however, because they are more likely to portray scientists than other types of characters on television.
- ♦ **Most people believe that scientists and engineers lead rewarding professional and personal lives, although a stereotypical image of these professions, deeply rooted in popular culture, exists and has been difficult to dislodge.** For example, 25 percent of those surveyed thought that scientists were apt to be odd and peculiar people, and 29 percent thought that scientists have few other interests but their work. In addition, a majority (53 percent) of those surveyed agreed with the statement “scientific work is dangerous.”
- ♦ **Belief in pseudoscience, including astrology, extrasensory perception (ESP), and alien abductions, is relatively widespread and growing.** For example, in response to the 2001 NSF survey, a sizable minority (41 percent) of the public said that astrology was at least somewhat scientific, and a solid majority (60 percent) agreed with the statement “some people possess psychic powers or ESP.” Gallup polls show substantial gains in almost every category of pseudoscience during the past decade. Such beliefs may sometimes be fueled by the media’s miscommunication of science and the scientific process.
- ♦ **Alternative medicine, defined here as any treatment that has not been proven effective using scientific methods, has been gaining in popularity.** One study documented a 50 percent increase in expenditures for alternative therapies and a 25 percent increase in the use of alternative therapies between 1990 and 1997. Also, more than two thirds of those responding to the NSF survey said that magnetic therapy was at least somewhat scientific, although no scientific evidence exists to support claims about its effectiveness in treating pain or any other ailment.